

Appl. No. 10/816,268
Response Dated June 21, 2006
Reply to Office Action of March 21, 2006

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A method, comprising:

retrieving a set of virtual addresses used by an agent;

assigning said virtual addresses to a first set of physical memory addresses;

generating a first assignment cost value comprising a measure of bandwidth for said assignment; and

reassigning said virtual addresses to a second set of physical addresses using said first assignment cost value.
2. (Original) The method of claim 1, wherein said first and second sets of physical addresses correspond to a plurality of memory types.
3. (Original) The method of claim 2, wherein said generating comprises:

identifying a number of data objects associated with said agent;

receiving a read rate value and a write rate value for said data objects;

mapping each data object to a memory type to form a first memory map;

determining a memory read traffic value using said read rate value and said first memory map, and a write traffic value using said write rate value and said first memory map;

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determining a read cost value and a write cost value for said memory types;
determining an assignment read cost value by multiplying said memory read traffic value with said read cost value, and an assignment write cost value by multiplying said memory write traffic value with said write cost value; and
generating said first assignment cost value by summing said assignment read cost value with said assignment write cost value.

4. (Original) The method of claim 3, wherein determining said read cost value and said write cost value comprises:

identifying at least one cost factor associated with each memory type; and
determining said read cost value and said write cost value using said at least one cost factor.

5. (Original) The method of claim 3, wherein receiving said read rate value and said write rate value for said data objects comprises:

receiving a read page count value and a write page count value; and
generating said read rate value and said write rate value using said read page count value and said write page count value, respectively.

6. (Original) The method of claim 3, wherein reassigning said virtual addresses comprises:

generating a second assignment cost value for said second set of physical addresses;

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comparing said second assignment cost value with said first assignment cost value; and

reassigning said virtual addresses to said second set of physical addresses if said second assignment cost value is lower than said first assignment cost value.

7. (Original) The method of claim 6, wherein generating said second assignment cost value comprises:

remapping each data object to a memory type to form a second memory map;
determining said memory read traffic value using said read rate and said second memory map, and said write traffic value using said write rate and said second memory map;

determining said assignment read cost value by multiplying said memory read traffic value with said read cost value, and said assignment write cost value by multiplying said memory write traffic value with said write cost value; and

generating said second assignment cost value by summing said assignment read cost value with said assignment write cost value.

8. (Original) The method of claim 3, wherein mapping each data object to a memory type to form a first memory map comprises:

determining a set of mapping constraints for said mapping; and
mapping each data object to a memory type to form said first memory map in accordance with said mapping constraints.

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9. (Original) The method of claim 1, wherein said reassigning comprises moving data objects for said agent from said first set of physical addresses to said second set of physical addresses.
10. (Currently Amended) An apparatus, comprising:
a task management module to retrieve a set of virtual addresses used by an agent;
a memory assignment module to couple to said task manager, said memory assignment module to assign said virtual addresses to a first set of physical memory addresses for a plurality of memory devices; and
a memory bandwidth module to couple to said memory assignment module, said memory bandwidth manager module to generate an assignment cost value comprising a measure of bandwidth for said assignment, and reassign said virtual addresses to a second set of physical addresses to lower said assignment cost value.
11. (Original) The apparatus of claim 10, further comprising a memory usage module to couple to said memory bandwidth module, said memory usage module to provide memory usage information to said memory bandwidth module to generate said assignment cost values.
12. (Original) The apparatus of claim 10, wherein said memory devices comprise internal memory and external memory.

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13. (Original) The apparatus of claim 10, wherein said memory devices have different latency times, throughput, or power requirements.

14. (Original) The apparatus of claim 10, wherein said agent comprises one of a software program and hardware device.

15. (Currently Amended) A system, comprising:

an antenna;

a processing system to connect to said antenna, said processing system having a processor and a plurality of memory devices; and

a memory management module to couple to said processing system, said memory management module to manage assigning a plurality of agents to use a first set of memory devices from said plurality of memory devices based on an assignment cost value comprising a measure of bandwidth for said assignment, and to reassign said plurality of agents to a second set of memory devices from said plurality of memory devices to lower said assignment cost value.

16. (Original) The system of claim 15, wherein said processing system further comprises a communication fabric to couple said processor to said memory devices.

17. (Original) The system of claim 15, wherein said memory management module comprises:

a task management module to retrieve a set of virtual addresses used by an agent;

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a memory assignment module to couple to said task manager, said memory assignment module to assign said virtual addresses to a first set of physical addresses for said plurality of memory devices; and

a memory bandwidth module to couple to said memory assignment module, said memory bandwidth module to generate said assignment cost values.

18. (Original) The apparatus of claim 16, further comprising a memory usage module to couple to said memory bandwidth module, said memory usage module to provide memory usage information to said memory bandwidth module to generate said assignment cost values.

19. (Currently Amended) An article comprising:

a storage medium;

said storage medium including stored instructions that, when executed by a processor, are operable to retrieve a set of virtual addresses used by an agent, assign said virtual addresses to a first set of physical memory addresses, generate a first assignment cost value comprising a measure of bandwidth for said assignment, and reassign said virtual addresses to a second set of physical addresses using said first assignment cost value.

20. (Original) The article of claim 19, wherein the stored instructions, when executed by a processor, generate said first assignment cost value using stored instructions operable to identify a number of data objects associated with said agent, receive a read

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rate value and a write rate value for said data objects, map each data object to a memory type to form a first memory map, determine a memory read traffic value using said read rate value and said first memory map, and a write traffic value using said write rate value and said first memory map, determine a read cost value and a write cost value for said memory types, determine an assignment read cost value by multiplying said memory read traffic value with said read cost value, and an assignment write cost value by multiplying said memory write traffic value with said write cost value, and generate said first assignment cost value by summing said assignment read cost value with said assignment write cost value.

21. (Original) The article of claim 20, wherein the stored instructions, when executed by a processor, reassign said virtual addresses using stored instructions operable to generate a second assignment cost value for said second set of physical addresses, compare said second assignment cost value with said first assignment cost value, and reassign said virtual addresses to said second set of physical addresses if said second assignment cost value is lower than said first assignment cost value.

22. (Original) The article of claim 21, wherein the stored instructions, when executed by a processor, generate said second assignment cost value using stored instructions to remap each data object to a memory type to form a second memory map, determine said memory read traffic value using said read rate and said second memory map, and said write traffic value using said write rate and said second memory map, determine said assignment read cost value by multiplying said memory read traffic value with said read

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cost value, and said assignment write cost value by multiplying said memory write traffic value with said write cost value, and generate said second assignment cost value by summing said assignment read cost value with said assignment write cost value.